CLAIMS

1. A sensor head apparatus employable with a multi-parameter monitoring tool assembly, comprising:

a sensor head body configured with a plurality of ports, where each of the plurality of ports is configured to engage and interconnect with an interchangeable sensor head component, whereby each of the plurality of ports is sized to receive one end of the interchangeable sensor head component, and engagement and disengagement of the interchangeable sensor head component within the plurality of ports occurs through application of a linear force upon the interchangeable sensor head component.

2. The apparatus of claim 1 wherein the plurality of ports are each configured to receive and engage an insertable portion of the interchangeable sensor head component, wherein a radially compressible sealing device is disposed around the insertable portion.

3. The apparatus of claim 2 wherein the plurality of ports includes first and second cylindrical portions, wherein the first cylindrical portion is configured to exit through an external surface of the first sensor head and include a first diameter, and the second portion is configured to begin a distance below the external surface and includes a second diameter larger than the first diameter, the plurality of ports being further configured such that upon insertion of the insertable portion through the first portion to the second portion, the radially compressive sealing device is configured to expand into the second portion creating a compressive force which resists withdrawal of the sensor component from the port.

4. The apparatus of claim 2 wherein the sensor head body further includes at least one atmospheric pathway incorporated therein which interconnects the plurality of the ports so as to distribute atmospheric gasses which may be compressed during engagement and interconnection of the interchangeable sensor head components in any of the plurality of ports.

5. The apparatus of claim 1 wherein the interchangeable sensor head component comprises at least one of: an interchangeable sensor and an accessory.

6. The apparatus of claim 5 wherein the interchangeable sensors may comprise at least one of: active and passive sensors.

7. The apparatus of claim 6 wherein one or more of the plurality of ports are configured to engage and interconnect with different types of the sensor head components including: the active sensors, the passive sensors, and the accessories.

8. The apparatus of claim 5 wherein the accessory may comprise at least one of: a wiper device, a shutter device and a stirring device.

9. The apparatus of claim 1 further comprising at least one engagement means employable for connecting the sensor head body to at least one other component.

10. The apparatus of claim 9 wherein the at least one engagement means further includes at least one of: a threaded portion for threadably engaging a first portion of the at least one other component and at least one radially compressive sealing device extending around a portion of the sensor head positionable for engaging a second portion of the at least one other component.

11. The apparatus of claim 10 wherein the at least one component comprises an environmentally sealable housing configured for enclosing at least one electronic components.

12. The apparatus of claim 1 wherein the sensor head body further includes a circuit board device attached thereto, wherein the first circuit board device includes a plurality of electrical interconnection plugs mounted thereon for providing the interconnection with the interchangeable sensor head components.

13. The apparatus of claim 12 wherein the plurality of ports pass from one side of the sensor head body to an opposing side, and the circuit board device is configurable to attach to the opposing side of the sensor head in manner such that the interconnections plugs are positionable in the plurality ports and provide an environmental seal.

14. The apparatus of claim 12 wherein the first circuit board device further includes at least one modular plug-in connection device mounted thereon for electrically connecting with at least one other circuit card device.

15. The apparatus of claim 1 wherein the sensor head body is further configured to attach to an enclosure device, wherein the enclosure device comprises at least one of: a restrictor, calibration container, and a flow cell.

16. The apparatus of claim 15 wherein the enclosure device is connectable to at least one other device which is positionable proximate to the sensor head body.

17. The apparatus of claim 16 wherein the at least one other device comprises at least one of: an additional sensor head which includes at least one port for receiving at least one of the interchangeable sensor head components and a stirring device.

18. A sensor head apparatus employable with a multi-parameter monitoring tool assembly, comprising:

a sensor head body including a plurality of ports for engaging and interconnecting with at least one interchangeable sensor head component, wherein the sensor head body further includes a circuit board device attached thereto, wherein the circuit board device includes a plurality of electrical interconnection plugs mounted thereon and positionable within the plurality of ports for providing the interconnection with the at least one interchangeable sensor head component.

19. The apparatus of claim 18 wherein the plurality of ports pass from one side of the sensor head body to an opposing side, and the circuit board device is configurable to attach to the opposing side of the sensor head in manner such that the interconnections plugs are positionable in the plurality ports and provide an environmental seal.

20. The apparatus of claim 18 wherein the engagement and disengagement of the interchangeable sensor within the plurality of ports occurs through application of a linear force upon the interchangeable sensor.

21. The apparatus of claim 20 wherein the plurality of ports are each configured to receive and engage an insertable portion of the interchangeable sensor head component, wherein at least one radially compressive sealing device is disposed around the insertable portion.

22. The apparatus of claim 21 wherein the plurality of ports includes first and second cylindrical portions, wherein the first cylindrical portion is configured to exit through an external surface of the first sensor head and include a first diameter, and the second portion is configured to begin a distance below the external surface and includes a second diameter larger than the first diameter, the plurality of ports being further configured such that upon insertion of the insertable portion through the first portion to the second portion, the radially compressive sealing device is configured to expand into the second portion creating a compressive force which resists withdrawal of the sensor component from the port.

23. The apparatus of claim 20 wherein the first sensor head further includes at least one atmospheric pathway incorporated therein which interconnects the plurality of

the ports so as to distribute atmospheric gasses which may be compressed during engagement and interconnection of the interchangeable sensor head components in the plurality of ports.

24. The apparatus of claim 18 wherein the interchangeable sensor head component comprises at least one of: an interchangeable sensor and an accessory.

25. The apparatus of claim 24 wherein the interchangeable sensors may comprise both active and passive sensors.

26. The apparatus of claim 25 wherein one or more of the plurality of ports are configured to engage and interconnect with different types of the sensor head components including: the active sensors, the passive sensors, and the accessories.

27. The apparatus of claim 24 wherein the accessory may comprise at least one of: a wiper device, a shutter device and a stirring device.

28. The apparatus of claim 18 further comprising at least one engagement means employable for connecting the sensor head body to at least one other component.

29. The apparatus of claim 28 wherein the at least one attachment means further includes at least one of: a threaded portion for threadably engaging a first portion of the at least one other component and at least one radially compressive sealing device extending around a portion of the sensor head positionable for engaging a second portion of the at least one other component.

30. The apparatus of claim 29 wherein the at least one component comprises an environmentally sealable housing configured for enclosing at least one electronic components.

31. The apparatus of claim 18 wherein the first circuit board device further includes at least one modular plug-in connection device mounted thereon for electrically connecting with at least one other circuit card device.

32. The apparatus of claim 18 wherein the sensor head body is further configured to attach to an enclosure device, wherein the enclosure device comprises at least one of: a restrictor, calibration container, and a flow cell.

33. The apparatus of claim 32 wherein the enclosure device is connectable to at least one other device which is positionable proximate to the sensor head body.

34. The apparatus of claim 33 wherein the at least one other device comprises at least one of: an additional sensor head which includes at least one port for receiving at least one of the interchangeable sensor head components and a stirring device.

35. A sensor head assembly employable with a multi-parameter monitoring tool assembly, comprising:

a first sensor head configured to engage and interconnect with at least one interchangeable sensor head components; and

an enclosure device attachable to the first sensor head which is configured to engage and support at least one other component at a predetermined proximity to the first sensor head.

36. The assembly of claim 35 wherein the at least one sensor head component comprise at least one of: an interchangeable sensor and an accessory device.

37. The assembly of claim 35 wherein the enclosure device comprises at least one of: a restrictor, a calibration container, and a flow cell.

38. The assembly of claim 35 wherein the enclosure device is further configured to provide an electrical connection from the at least one other component to the first sensor head.

39. The assembly of claim 35 wherein the at least one other component comprises a second sensor head configured to engage and interconnect with the at least one interchangeable sensor head component.

40. The assembly of claim 35 wherein the at least one other component comprises an electro-mechanical stirring device.

41. The assembly of claim 40 wherein the electromechanical stirring device comprises a magnetic stirrer.

42. The assembly of claim 40 wherein the enclosure device is further configured to provide an electrical connection from the electro-mechanical stirring device to the first sensor head.

43. The assembly of claim 35 wherein the first sensor head and the attachment device are attachable through engagement of a threaded portion on the first sensor head with a mating threaded portion configured on the attachment device.